Solar Array for a Starshade Inner Disk, Phase II

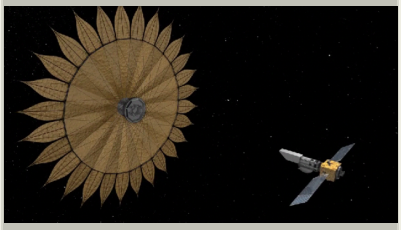
Completed Technology Project (2017 - 2020)

Project Introduction

This PhaseII program will focus on integrating viable solar cell blanket assemblies onto the inner disk of a starshade needed for potential exoplanet discovery missions. The Phase II will design and analyze structural interfaces, harness requirements, harness routing, survival and durability for packaging, launch and on-orbit environmental requirements. The program will involve numerous hardware demonstration units and testing and culminate in a full scale demonstration unit with a portion of active solar cells. This will move the inner disk with solar cells to TRL 5. The inner disk of the baseline starshade is approximately 10 m in diameter. This large surface area is an ideal location for solar arrays which will allow for solar electric propulsion. SEP will allow the starshade to transition to new orbit positions relative to the telescope more efficiently which will expand the exoplanet science during the mission lifetime.

Anticipated Benefits

Technology developed during this SBIR program will be directly applied to any NASA telescope program involved with exoplanet discovery and characterization that needs an external occulter, or Starshade. The Exo-S STDT Final Report identified a potential rendezvous mission with WFIRST/AFTA because it is a large astrophysics telescope capable of supporting direct imaging with a starshade, and the current timing of its development fits with a potential starshade development and launch.This solar array system would apply to any commercial or DOD application where a high stiffness, high strength solar array is needed. The design is scalable up to 20 to 30 m diameters which could achieve up to 300 KW. Arrays of this size can power solar electric propulsion systems. The strength and stiffness will allow high acceleration and maneuver loads.



Solar Array for a Starshade Inner Disk, Phase II Briefing Chart Image

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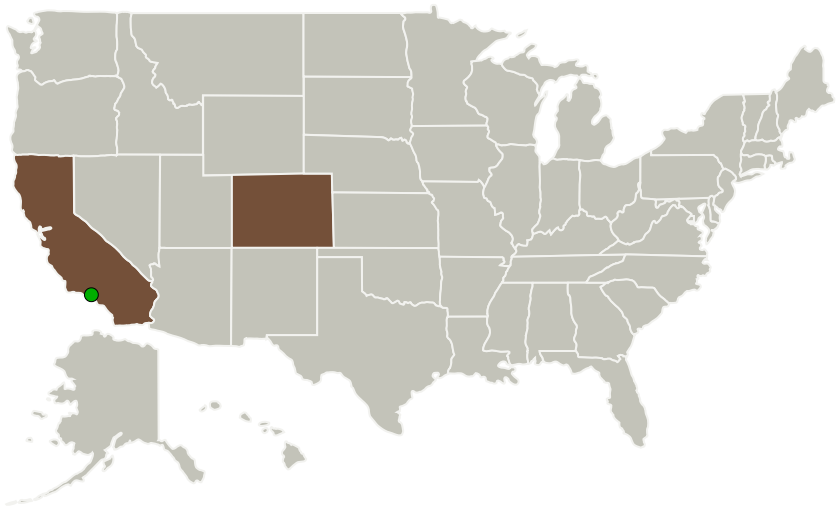
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Tendeg LLC	Lead Organization	Industry Small Disadvantaged Business (SDB)	Louisville, Colorado
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Colorado

Project Transitions

April 2017: Project Start

August 2020: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140965)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tendeg LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Managers:

Robert A Jones
Carol R Lewis

Principal Investigator:

Neal Beidleman

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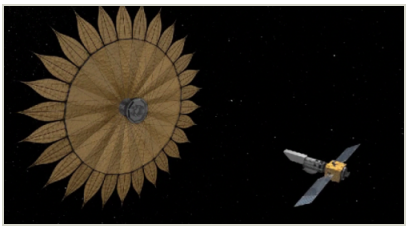
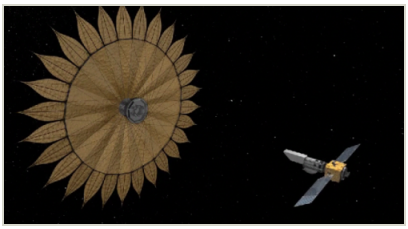
Images



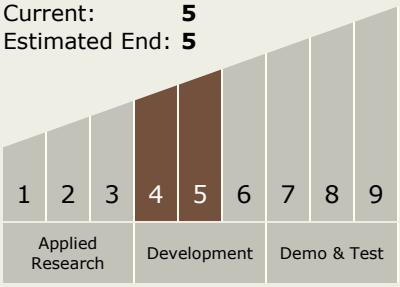
Briefing Chart Image
Solar Array for a Starshade Inner Disk, Phase II Briefing Chart Image *(https://techport.nasa.gov/image/134852)*



Final Summary Chart Image
Solar Array for a Starshade Inner Disk, Phase II *(https://techport.nasa.gov/image/130198)*

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System